

The family Trochidae (Mollusca: Gastropoda) in the Sydney metropolitan area and adjacent coast

Patty Jansen

Tarthost 1109, 6708 JL Wageningen, the Netherlands

ABSTRACT

Twenty-five species of Trochidae from the Sydney metropolitan area are discussed here: *Herpetopoma aspersa* (Philippi, 1846), *Vaceuchelus ampullus* (Tate, 1893), *Granata imbricata* (Lamarck, 1822), *Clanculus* (*Euriclanculus*) *brunneus* A. Adams, 1853, *Clanculus* (*Euriclanculus*) *floridus* Philippi, 1848, *Clanculus* (*Euclanculus*) *clangulus* (Wood, 1828), *Clanculus* (*Mesoclanculus*) *plebejus* Philippi, 1851, *Clanculus* (*Isoclanculus*) *undatoides* T. Woods, 1879, *Clanculus* (*Macroclanculus*) *maugeri* Wood, 1828, *Austrocochlea concamerata* (Wood, 1828), *Austrocochlea constricta* (Lamarck, 1822), *Notogibbula bicarinata* (A. Adams, 1854), *Eurytrochus strangei* (A. Adams, 1853), *Cantharidella picturata* (A. Adams and Angas, 1864), *Fossarina patula* (A. Adams and Angas, 1863), *Phasianotrochus eximius* (Perry, 1811), *Odontotrochus indistinctus* (Wood, 1828), *Gena impertusa* (Burrow, 1815), *Calliostoma* (*Fautor*) *comptum* A. Adams, 1854, *Astelena scitula* (A. Adams, 1855), *Ethminolia probabilis* Iredale, 1924, *Talopena gloriola* Iredale, 1929, *Monilea callifera* (Lamarck, 1822), *Bankivia fasciata* (Menke, 1830) and *Leioptyrga lineolaris* (Gould, 1861). The use of the name *Odontotrochus indistinctus* for the species formerly referred to as *Thalotia marginata* T. Woods, 1879 or *T. comtessei* Iredale, 1931 is new.

INTRODUCTION

The Sydney metropolitan area has a varied coastline composed of many habitats. A great variety of marine molluscs have been described from this area. The latest checklist of marine molluscs of New South Wales (Iredale and McMichael 1962) records 2 063 species, including 54 species of Trochidae. However, for today's shell-enthusiasts, it is very hard to identify shells found in the Sydney area as the available popular literature is grossly inadequate; a reference book on marine molluscs of the Sydney area, especially the smaller ones, is yet to be published. One family, where this is evident, is the Trochidae. Many species that can commonly be found on beaches or intertidal rock flats have been omitted from recent popular literature and, in order to identify them, it may be necessary to go back to the original descriptions. The aim of this article is to identify and describe 25 species of Trochidae that can be found on beaches or intertidally in the Sydney metropolitan area and adjacent coasts, and to describe the habitats in which they are likely to be found.

METHODS

The shells were collected between June 1988 and July 1991. A range of locations in different habitats were visited. Some collecting sites were visited only once, while repeated visits were made to others. To identify the type of habitats

where shells could be found, the sites were classified as exposed, sheltered ocean, or estuarine shores. This was done subjectively, on the basis of exposure to surf. Exposed ocean shores were those receiving the full force of surf; sheltered ocean beaches were those protected from the surf, but are situated on the open ocean; and estuarine shores were those well within bays and exposed to minimal surf.

The classification and number of times collecting sites were visited are shown in Table 1; Figs 1 and 2 show the location of the collecting sites.

Collecting was mainly carried out on beaches. It was considered undesirable to collect live animals as this survey did not include studies of the animals themselves. Sometimes, live shells were included in the survey results, and this is indicated by the phrase "observed live".

The identification of shells was made with the aid of publications by Wilson and Gillett (1985), Macpherson and Gabriel (1962), Hinton (1981), May (1923), Short and Potter (1987), or literature containing original descriptions of shells, and by comparing shells with those held in the collection of the Australian Museum. The arrangement of the species in subfamilies follows Hickman and McLean (1990). The genera *Vaceuchelus*, *Eurytrochus*, *Astelena*, the subgenus *Fautor* and the subgenera of *Clanculus* were not specified by these authors. They have, however, been

Table 1. Collecting sites in the Sydney metropolitan area and adjacent coasts, habitats and the number of times each site was visited.

Location	Abbreviation and figure No.		Habitat	Number of times visited
Airport	A	1	estuarine/sandy	8
Bulli	B	2	exposed ocean/rocky	1
Bradley's Head	BH	1	estuarine/rocky	3
Callala Bay	CB	2	sheltered ocean/rocky	1
Clovelly	CV	1	exposed ocean/rocky	2
Cronulla	C	1	exposed ocean/sandy	2
Cronulla's Shelly Beach	CSB	1	exposed ocean/rocky	7
Dee Why	DW	1	exposed ocean/sandy/rocky	1
Dolls Point	DP	1	estuarine/sandy	3
Foreshore Road	FR	1	estuarine/sandy	6
Huskisson	H	2	sheltered ocean/rocky	1
Kurnell	K	1	sheltered ocean/rocky to estuarine/sandy	20
La Perouse	LP	1	sheltered ocean/rocky	15
Long Reef	LR	1	exposed ocean/rocky	1
Manly's Shelly Beach	MSB	1	sheltered to exposed ocean/rocky	4
Maroubra	M	1	exposed ocean/sandy/rocky	4
Narrabeen	NB	1	exposed ocean/rocky	5
Newcastle Town Beach	NTB	2	exposed ocean/rocky	2
Newport	NP	1	exposed ocean/rocky	5
Norah Head	NH	2	exposed ocean/rocky	3
Pretty Beach	PB	2	estuarine/sandy	1
Shellharbour	SH	2	sheltered ocean/rocky	2
Yarra Bay	YB	1	estuarine/sandy	5

accepted as valid by Cunningham-Vaught (1989) and were used in accordance with the arrangement of the species in the collection of the Australian Museum.

Illustrations of the species were provided when they were not illustrated in Wilson and Gillett (1979), Hinton (1981), Macpherson and Gabriel (1962), Short and Potter (1987), or when it was thought that identification would be facilitated if an illustration of the shell was provided. Comments on the habitat and distribution of species were based on the author's observations. All shells are currently held by the author.

Collecting results

Subfamily Eucyclinae

Herpetopoma aspersa (Philippi, 1846).

This is a well-known species. Greatest diameter of shell up to 15 mm, but mostly smaller; height and width about equal. Whorls rounded; mouth almost circular, occupying half the length of the shell. Sculpture consisting of fine spiral ribs, about 15 on the body whorl, depending on the size of the shell. The ribs have a rough appearance and are crossed by fine growth lines. The ribs are usually as wide as the interstices between them. Outer lip crenulated; inside of the shell ribbed. Columella smooth except for a small tooth near the base of the shell; no umbilicus present.

Colour light brown or pink with numerous irregular red or brown spots. Inside iridescent.

Locations: Newcastle Town Beach, Norah Head, Manly's Shelly Beach, Kurnell, Shellharbour.

Habitat and distribution: This species was observed live intertidally under stones on exposed and sheltered rocky shores. The shell is extremely common on beaches. It occurs from southern Western Australia to Northern New South Wales including Tasmania.

Reference: Wilson and Gillett (1985), p. 38.

Vaceuchelus ampullus (Tate, 1893). (Plate 1, fig. 5)

This is closely related to the previous species, but it is relatively unknown.

Largest diameter up to 10 mm; height and width about equal. Spire of medium height. Mouth occupying one half of the total length of the shell; mouth almost circular. Sculpture on the body whorl consisting of seven spiral ribs, the top four of which are strong and prominent, the last three are on the base of the shell and less pronounced. These ribs are crossed by longitudinal ribs, which are most prominent in the interstices between the spiral ribs. Outer lip and columella smooth, no umbilicus present.

Colour off-white to pink. The spiral ribs bear irregular red spots.

Locations: Norah Head, Narrabeen.

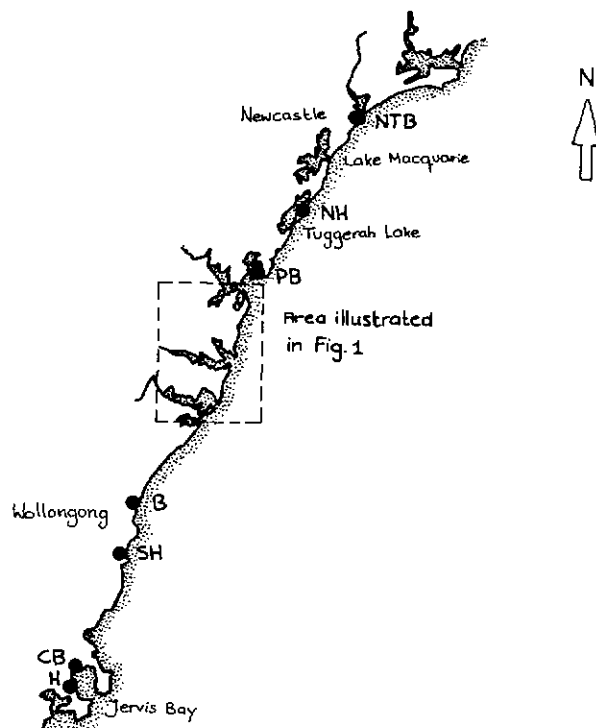
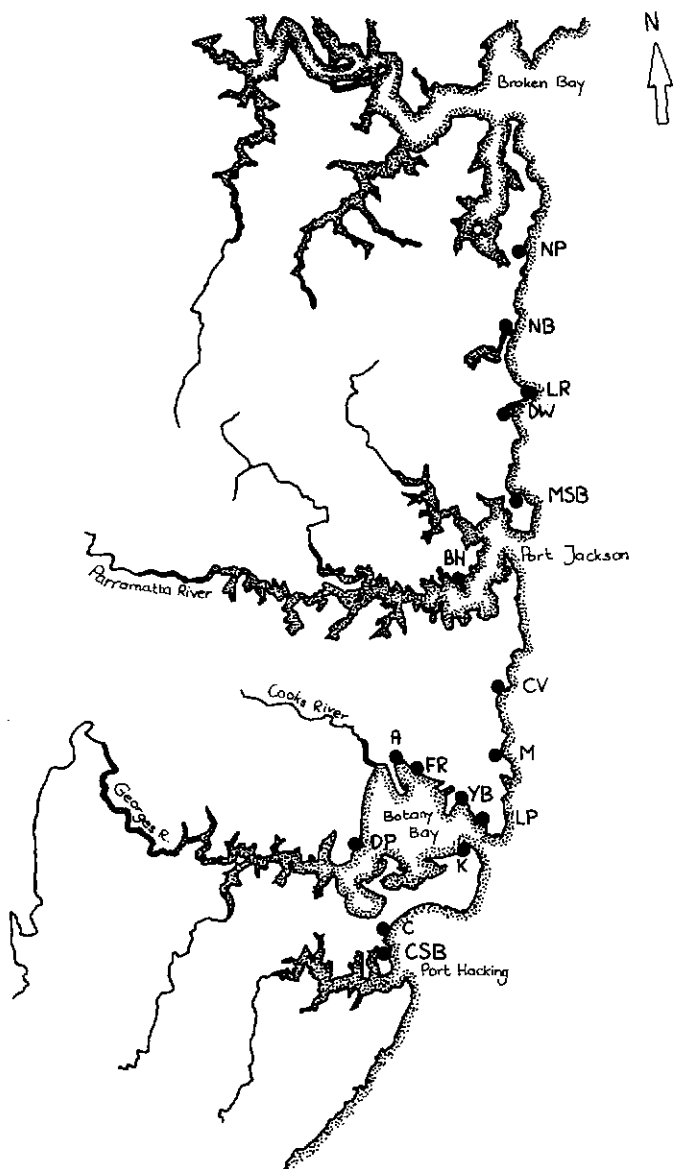


Fig. 1 (left). Collecting sites in the Sydney metropolitan area. See Table 1 for abbreviations.

Fig. 2. (above). Collecting sites north and south of the Sydney metropolitan area. See Table 1 for abbreviations.

Habitat and distribution: This species was found only on rocky ocean shores. It seems that it is rare as a total of only three specimens were found; live animals were not observed. It occurs in southern Western Australia, New South Wales and Queensland; the Australian Museum does not have any specimens from Victoria.

Reference: Tate (1893).

Granata imbricata (Lamarck, 1822)

There has been some confusion as to where this species should be placed, although a number of authors have placed it in the genus *Stomatella* in the subfamily *Stomatellinae*. Recent publications, however, have put it in the genus *Granata* (Hickman and McLean 1990). The shells in this genus differ from those in *Stomatella* by being less elongated and by having a prominent sculpture. Shell up to 50 mm

wide, but mostly smaller, height seldom exceeding 10 mm. Spire flat; mouth occupying two thirds of the total shell length. Mouth wide and almost circular when observed from the underside of the shell. Sculpture consisting of many fine spiral cords, mostly wider than the interstices between them, crossed by longitudinal ribs, forming small scales on the spiral cords. Outer lip crenulated; columella smooth and curved; no umbilicus present. Inside of the shell ribbed.

Colour off-white to light brown, with brown spots on the spiral ribs. Inside iridescent.

Locations: Newport, Manly's Shelly Beach, Kurnell.

Habitat and distribution: Shells are common on rocky ocean beaches. The animal lives intertidally on rocky exposed and sheltered ocean shores. Animals were observed on hard substrate under stones at Newport and Long

Reef. The animal is white and possesses numerous tentacles around the edges of the mantle. The animal has a small, horny operculum. The species occurs from southern Western Australia to New South Wales.

Reference: Macpherson and Gabriel (1962), p. 55 (as *Stomatella imbricata*).

Subfamily Trochinae

Tribe Trochini

Clanculus (Euriclanculus) brunneus A. Adams, 1853. (Plate 3, fig. 1)

Shell medium-sized, greatest diameter 16 mm, width greater than height. Mouth triangular, occupying two-fifths of the total shell height. Spire of medium height; spire whorls flat; sutures only slightly indented or impressed. Sides of spire straight. Sculpture consisting of irregular spiral rows of nodules, wider than the interstices between them. The body whorl has a prominent and sharp keel. Outer lip sharp, lirate within. The columella is straight and bears one bifid tooth. Umbilicus wide and deep.

Colour mostly a dirty brown, but sometimes red or pink. Mottled with blotches of dark brown, black or dark red. The base of the shell usually has a lighter colour and is irregularly spotted with brown, red or pink. Apex frequently green, especially in worn specimens.

Locations: Manly's Shelly Beach, Kurnell, Callala Bay.

Habitat and distribution: This species is reasonably common on rocky exposed and sheltered ocean shores. The animal lives intertidally under stones. It occurs in New South Wales. The Australian Museum has one worn specimen from Fitzroy Island, Queensland; this record needs further investigation.

This species is often confused with *C. limbatus* Quoy and Gaimard, 1834. However, the latter does not occur in the Sydney area, but is common in Victoria, South Australia and Western Australia.

Reference: Adams (1851).

Clanculus (Euriclanculus) floridus Philippi, 1848. (Plate 3, fig. 2)

Shell medium-sized, greatest diameter up to 13 mm, shell width greater than height. Mouth triangular, occupying one half of the total shell height. Spire of medium height; spire whorls rounded; sutures impressed. Sides of spire

straight to convex. Sculpture consisting of regular spiral rows of nodules, continuing, but becoming smaller on the base of the shell. Outer lip sharp, lirate within, bearing one tooth near the suture. Columella straight, bearing one prominent bifid tooth. Umbilicus wide and deep.

Colour pink or light brown, with a pattern of darker blotches especially below the suture of the body whorl. Columella and area around the umbilicus white. Inside iridescent.

Locations: Newport, Narrabeen, Bradley's Head, Kurnell.

Habitat and distribution: This species is not uncommon on rocky exposed and sheltered ocean beaches. The animal lives under stones intertidally. It occurs in eastern Victoria and New South Wales.

Reference: Allan (1950), p. 60.

Clanculus (Euclanculus) clangulus (Wood, 1828) (Plate 3, fig. 3)

Shell medium-sized, greatest diameter up to 15 mm, width greater than height. Mouth triangular, occupying two-fifths of the total shell height. Spire high; spire whorls rounded; sutures impressed; sides of spire straight to slightly concave. Sculpture consisting of narrow spiral cords, seven to eight on the body whorl, which bear small nodules. The interstices between the cords are wider than the cords themselves close to the suture, the cords becoming more crowded toward the widest point of the shell. The base is covered with spiral cords, closely packed together. Outer lip sharp, lirate within and bearing one tooth close to the suture. Columella bearing a prominent bifid tooth near the base of the shell. Umbilicus wide and deep.

Colour dark green to olive brown, mottled with red. The base of the shell is often much lighter in colour and bears numerous small red spots. Columella and area near umbilicus white. Inside iridescent.

Locations: Norah Head, Manly's Shelly Beach, Kurnell.

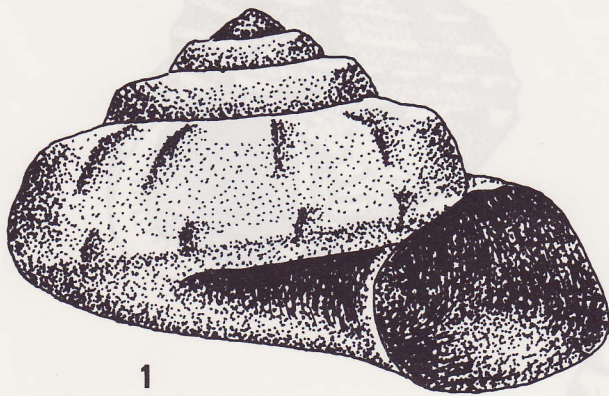
Habitat and distribution: This species is not uncommon on exposed and sheltered rocky beaches.

The animal lives under stones intertidally and subtidally. This species occurs in New South Wales and southern Queensland.

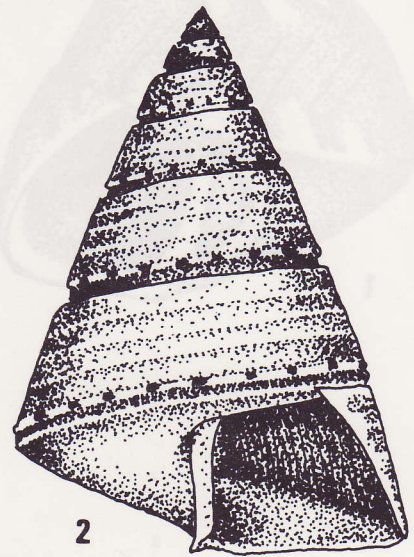
Reference: Wilson and Gillett (1985), p. 40.



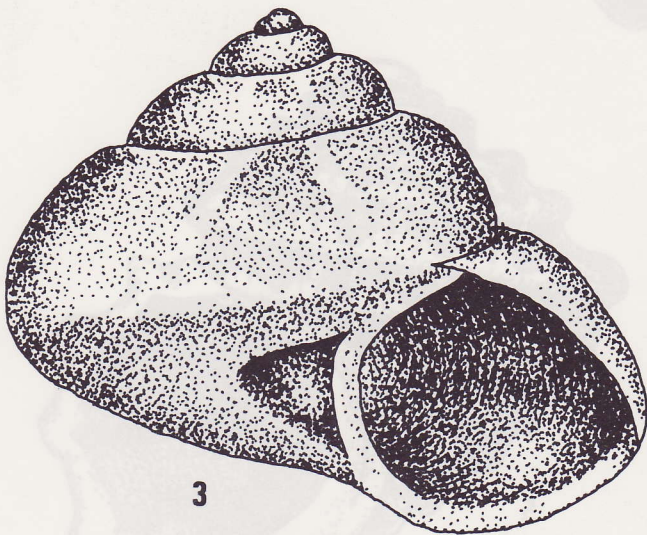
Plate 1. 1. *Cantharidella picturata* A. Adams and Angas, 1864; 2. *Eurytrochus strangei* A. Adams, 1853; 3. *Leiopyrga lineolaris* Gould, 1861; 4. *Odontotrochus indistinctus* Wood, 1828; 5. *Vaceuchelus ampullus* Tate, 1893.



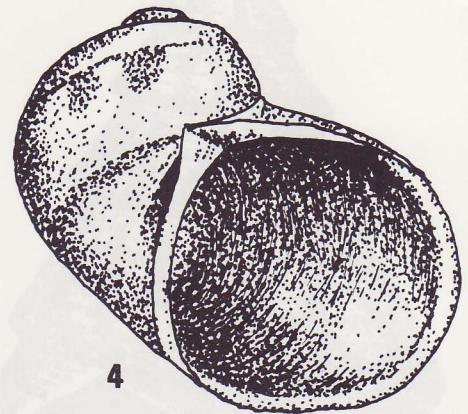
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Plate 2. 1. *Ethminolia probabilis* Iredale, 1924; 2. *Calliostoma (Fautor) comptus* A. Adams, 1854; 3. *Talopena gloriola* Iredale, 1929; 4. *Fossarina patula* A. Adams and Angas, 1864.

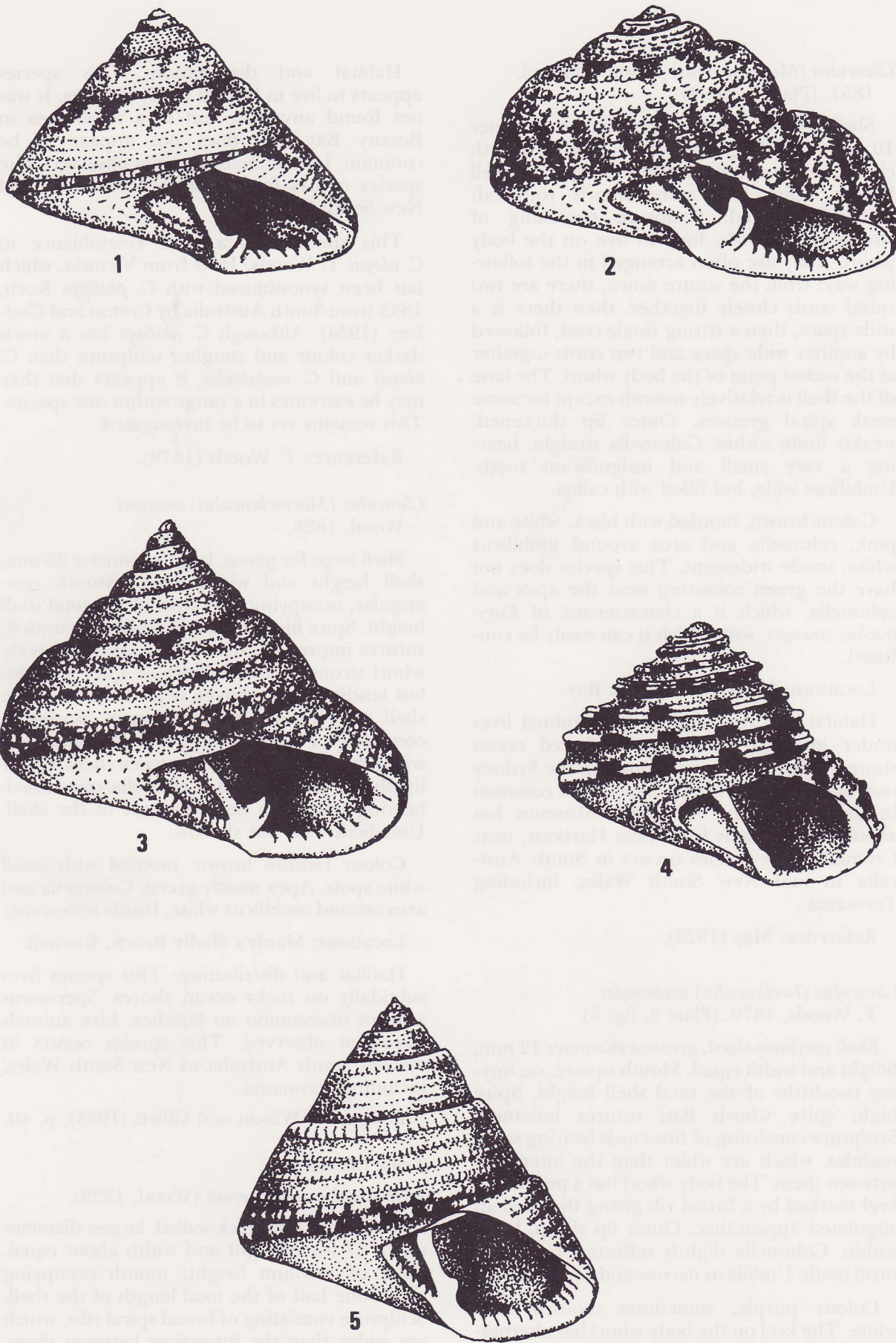


Plate 3. 1. *Clanculus (Euriclanculus) brunneus* A. Adams, 1853; 2. *Clanculus (Euriclanculus) floridus* Philippi, 1843; 3. *Clanculus (Euclanculus) clangulus* Wood, 1828; 4. *Clanculus (Mesoclanculus) plebejus* Philippi, 1851; 5. *Clanculus (Isoclanculus) undatoides* T. Woods, 1879.

Clanculus (Mesoclanculus) plebejus Philippi,
1851. (Plate 3, fig. 4)

Shell small to medium-sized, largest diameter 10 mm, width greater than height. Mouth circular, occupying two-fifths of the total shell height. Spire low; spire whorls rounded; sutures indented. Sculpture consisting of strong spiral cords, four to five on the body whorl. They are often arranged in the following way: from the suture down, there are two spiral cords closely together, then there is a wide space, then a strong single cord, followed by another wide space and two cords together at the widest point of the body whorl. The base of the shell is relatively smooth except for some weak spiral grooves. Outer lip thickened, weakly lirate within. Columella straight, bearing a very small and insignificant tooth. Umbilicus wide, but filled with callus.

Colour brown, mottled with black, white and pink, columella and area around umbilicus white, inside iridescent. This species does not have the green colouring near the apex and columella, which is a characteristic of *Eurytrochus strangei*, with which it can easily be confused.

Locations: Huskisson, Callala Bay.

Habitat and distribution: The animal lives under intertidal stones on sheltered ocean shores. The shell was not found in the Sydney metropolitan area, but becomes more common in the south. The Australian Museum has about 50 specimens from Boat Harbour, near Cronulla. The species occurs in South Australia to mid New South Wales, including Tasmania.

Reference: May (1923).

Clanculus (Isoclanculus) undatoides
T. Woods, 1879. (Plate 3, fig. 5)

Shell medium-sized, greatest diameter 12 mm, height and width equal. Mouth square, occupying two-fifths of the total shell height. Spire high; spire whorls flat; sutures indented. Sculpture consisting of fine cords bearing small nodules, which are wider than the interstices between them. The body whorl has a prominent keel marked by a broad rib giving the shell an angulated appearance. Outer lip sharp, lirate within. Columella slightly reflected, bearing a small tooth. Umbilicus narrow and very shallow.

Colour purple, sometimes mottled with white. The keel on the body whorl has alternating white and purple spots. Inside iridescent.

Locations: Yarra Bay, Foreshore Road, Airport.

Habitat and distribution: This species appears to live in bays in sandy habitats. It was not found anywhere but in a small area in Botany Bay and does not appear to be common. Live animals were not observed. The species occurs from eastern Victoria to mid New South Wales.

This species has a close resemblance to *C. aloysii* T. Woods, 1879 from Victoria, which has been synonymized with *C. philippi* Koch, 1843 from South Australia by Cotton and Godfrey (1934). Although *C. philippi* has a much darker colour and rougher sculpture than *C. aloysii* and *C. undatoides*, it appears that they may be extremes in a range within one species. This remains yet to be investigated.

Reference: T. Woods (1879).

Clanculus (Macroclanculus) maugeri
Wood, 1828.

Shell large for genus, largest diameter 25 mm, shell height and width equal. Mouth rectangular, occupying one third of the total shell height. Spire high; spire whorls flatly rounded; sutures impressed. Base of the shell flat; body whorl strongly keeled. Sides of spire straight, but tending to be convex near the base of the shell and concave near the apex. Sculpture consisting of spiral rows of nodules, which are wider than the interstices between them. Outer lip sharp, lirate within. Columella crenulated, bearing one tooth near the base of the shell. Umbilicus wide but shallow.

Colour reddish brown, mottled with small white spots. Apex mostly green. Columella and area around umbilicus white. Inside iridescent.

Locations: Manly's Shelly Beach, Kurnell.

Habitat and distribution: This species lives subtidally on rocky ocean shores. Specimens are not uncommon on beaches. Live animals were not observed. This species occurs in eastern South Australia to New South Wales, including Tasmania.

Reference: Wilson and Gillett (1985), p. 40.

Tribe Gibbulini

Austrocochlea concamerata (Wood, 1828).

Shell heavy and thick-walled, largest diameter up to 27 mm; height and width about equal. Spire of medium height; mouth occupying about one half of the total length of the shell. Sculpture consisting of broad spiral ribs, which are wider than the interstices between them. Outer lip sharp and smooth. Columella smooth except for a small tooth near the base of the shell; no umbilicus present.

Colour black, the spiral ribs bear small yellow, often triangular spots. Inside white.

Locations: Manly's Shelly Beach, Shell-harbour.

Habitat and distribution: On intertidal rocks in sheltered bays. Not common in the Sydney metropolitan area, but becoming more common to the south. It occurs from southern Western Australia to mid New South Wales, including Tasmania.

Reference: Macpherson and Gabriel (1962), p. 69.

Austrocochlea constricta (Lamarck, 1822).

Shell heavy and thick-walled, not unlike the previous species, but higher spired and often much more eroded. Largest diameter up to 30 mm; height greater than width. When not eroded, a sculpture of broad spiral cords is visible. The cords are irregularly placed, but are usually most prominent around the widest point of the shell. The surface of the shell is rough, often marked by mended breaks and growth lines. Outer lip sharp, inside denticulate; columella smooth except for a small tooth, reduced to an insignificant knob; no umbilicus present. Inside of the shell strongly spirally ribbed.

Colour dark purple to black, marked with bands of dirty white. Inside white.

Locations: Manly's Shelly Beach, Airport, Kurnell, Cronulla's Shelly Beach.

Habitat and distribution: Extremely common. The animal lives on exposed rocks on intertidal rock flats on both ocean shores and estuarine habitats. It occurs from southern Western Australia to mid-Queensland including Tasmania.

Reference: Wilson and Gillett (1985), p. 36.

Notogibbula bicarinata (A. Adams, 1854).

Shell solid, greatest diameter 10 mm, height and width about equal. Mouth square, occupying one half of the total shell height. Whorls strongly shouldered and keeled, giving the shell a square appearance. Shell surface smooth, but not polished. Outer lip and columella smooth; umbilicus narrow but deep.

Colour a delicate pink with dark purple or brown markings. Sometimes there is a pattern of darker pink zig-zag lines.

Locations: Narrabeen, Yarra Bay.

Habitat and distribution: Uncertain, as only a few specimens were found, but the species

seems to inhabit sandy bays. The specimens from Narrabeen may have come from the nearby sandy lagoon (see Fig. 1). No live animals were observed. This species occurs from southern Western Australia to New South Wales, including Tasmania.

Reference: Macpherson and Gabriel (1962), p. 61 (as *Gibbula coxi* Angas, 1867).

Eurytrochus strangei (A. Adams, 1853).

(Plate 1, fig. 2)

Shell small, but solid, largest diameter up to 10 mm; height and width about equal. Mouth round, occupying up to half of the total shell height. Spire whorls rounded, sutures impressed. Sculpture consisting of four to five prominent ribs, much narrower than the interstices between them. Base of the body whorl distantly ribbed. Outer lip sharp, denticulate within; columella smooth and slightly reflected. Umbilicus narrow but deep.

Colour dark olive brown mottled with black and white. The base is covered in pink lines, which are most prominent near the umbilicus, where the background is white. Apex and columella often tinted green. Inside iridescent.

Locations: Norah Head, Bradley's Head, Foreshore Rd, Kurnell.

Habitat and distribution: This species is common intertidally under stones on ocean shores and bays and can be found together with *Cantharidella picturata*. It occurs in eastern Victoria and New South Wales.

Reference: Macpherson and Gabriel (1962), p. 62.

Cantharidella picturata (A. Adams and Angas, 1864). (Plate 1, fig. 1)

Shell small, largest diameter up to 8 mm; height and width about equal. Mouth square, occupying one half of the height of the shell. Spire whorls flat, sutures barely impressed. Sides of spire convex; apex blunt. Shell smooth apart from two ribs which run along the keel of the body whorl. Outer lip sharp; columella smooth; umbilicus narrow but deep.

Colour red or brown patterns on a white background. Columella white.

This species is often confused with *Eurytrochus strangei*, from which it can be separated by its smoother and flatter whorls, blunter apex and more reddish colours.

Locations: Newcastle Town Beach, Kurnell, Norah Head, Narrabeen, Manly's Shelly Beach.

Habitat and distribution: This species is common under intertidal stones on rock flats on exposed and sheltered ocean shores, where it can be found together with *Eurytrochus strangei*. It is common in shell grit on beaches. This species occurs in eastern Victoria and New South Wales.

Reference: Macpherson and Gabriel (1962), p. 62.

Fossarina patula (A. Adams and Angas, 1863).
(Plate 2, fig.4)

Shell small, greatest diameter 5 mm; shell width greater than height. Mouth large and circular, occupying two-thirds of the total shell height. Spire short, spire whorls rounded. Shell usually eroded, but otherwise smooth, but not polished. Outer lip sharp; columella smooth. Umbilicus narrow.

Colour off-white to yellow, irregularly mottled with bands or spots of chocolate brown, which also appear on the inside of the shell. Columella white.

Locations: Norah Head, Narrabeen, La Perouse, Kurnell.

Habitat and distribution: In shell grit on rocky exposed and sheltered ocean beaches, not common. No live animals were found. The species occurs in New South Wales.

Reference: Adams and Angas (1863).

Tribe *Cantharidini*

Phasianotrochus eximius (Perry, 1811.)

A well-known southern Australian species, largest diameter up to 40 mm, but Sydney specimens seldom reach this size; height of shell greater than width. High-spired; mouth occupying about one third of the total height of the shell, mouth teardrop-shaped. Spire whorls flatly rounded; sutures slightly impressed. Sculpture almost non-existent in some specimens, others bear thin spiral grooves, up to ten on the body whorl. Shell highly polished. Outer lip thick and rounded in mature specimens; inside of outer lip smooth. Columella smooth except for one tooth near the base of the shell; no umbilicus present.

Colour mostly a rich olive or reddish brown. The presence of the spiral grooves is marked by a thin lighter coloured bands. Smooth specimens have only the spiral bands. Some have a pattern of mottled white, especially on earlier whorls. The inside is vivid iridescent blue.

Locations: Newcastle Town Beach, Norah Head, Narrabeen, Manly's Shelly Beach, Bradley's Head, Clovelly, Kurnell, Cronulla's Shelly Beach, Bulli.

Habitat and distribution: This species lives on seaweed below the low-tide mark on rocky ocean shores. It is common on beaches. It occurs from southern Western Australia to southern Queensland including Tasmania.

Reference: Wilson and Gillett (1985), p. 38.

Odontotrochus indistinctus (Wood, 1828).
(Plate 1, fig. 4)

Much confusion has existed over the names used for this common Sydney shell. *Thalotia marginata* T. Woods, 1879 and *T. comtessei* Iredale, 1931 are those that are currently used. However, recent investigations (W. F. Ponder, pers. comm.) have shown that these names were preceded by Wood's name. Although Wood's holotype cannot be determined with certainty, there are five specimens of this species in the British Museum of Natural History labelled *Trochus indistinctus*, which Dr Ponder has designated as possible types. It is hoped that this will resolve the confusion.

Shell solid and conical, greatest diameter up to 25 mm, height greater than width. Mouth square, occupying up to one third of the total shell height. Spire high, spire whorls flat, in mature specimens the sutures are indented, because each whorl starts below the widest point of the previous whorl. Sculpture consisting of spiral threads of rounded nodules, which are closer together at the widest point of the whorls and the base of the body whorl than closer to the sutures. Outer lip sharp, inside smooth. Columella smooth except for one insignificant tooth near the base of the shell. No umbilicus present.

Colour grey, mottled with dark purple or red and white spots. Inside iridescent.

Locations: Pretty Beach, Foreshore Road, Kurnell.

Habitat: Lives in sheltered, sandy bays. Live animals are often washed ashore after storms. It occurs from eastern Victoria to mid Queensland.

Reference: Iredale (1931), Short and Potter (1987).

Subfamily *Stomatellinae*

Gena impertusa (Burrow, 1815).

Shell ear-shaped, thin, greatest diameter 13 mm; width much greater than height.

Mouth occupying most of the underside of the shell, spire barely elevated. Sculpture consisting of very fine spiral grooves crossed by growth lines. The columella and outer lip join each other uninterrupted; no umbilicus present.

Colour delicate and varied. Mostly dark brown or green with an irregular or spiral pattern of lighter coloured lines, which are often white, pink, red or purple. Inside bluish iridescent.

Locations: Dee Why, Maroubra, Kurnell, Cronulla's Shelly Beach.

Habitat and distribution: On the underside of rocks on rocky exposed and sheltered ocean shores. The animal of this species is very active, when a stone is turned, it immediately starts to crawl to the unexposed side of the stone at great speed. When disturbed it sheds part of its foot. The species occurs from New South Wales south to Victoria and Tasmania. *S. auricula* Lamarck, 1816 from Victoria to Western Australia is possibly a synonym.

Reference: Macpherson and Gabriel (1962), p. 74.

Subfamily Calliostomatinae

Calliostoma (Fautor) comptum A. Adams, 1854.
(Plate 2, fig. 2)

Shell small, greatest diameter up to 6 mm; shell height greater than width. Mouth square, about one third of the total shell height. Spire high; spire whorls flat; sutures impressed; sides of spire straight. Body whorl strongly keeled. Sculpture consisting of four spiral cords bearing small nodules. Base of the shell with very fine spiral lines. Outer lip sharp; columella straight and smooth, no umbilicus present.

Colour light brown. The spiral cord closest to the widest point of each whorl bears alternating white and pink spots. The apex is often purple. *Calliostoma purpureocinctum* Hedley, 1894 is a synonym.

Locations: Norah Head, Newport, Kurnell.

Habitat and distribution: This species can be found in shell grit on rocky exposed and sheltered ocean shores. It does not appear to be common and no live animals were observed. This species occurs from Victoria to mid New South Wales.

Reference: Adams (1854).

Astelena scitula (A. Adams, 1855).

Shell medium-sized, greatest diameter 15 mm, height and width equal. Mouth circular, occupying two-fifths of the total shell height. Spire high,

spire whorls flatly rounded, sutures impressed. Sides of spire concave. Sculpture consisting of many fine spiral cords, which are irregular. A more prominent cord usually exists at the widest point of the body whorl. Outer lip sharp; columella smooth; umbilicus narrow.

Colour light brown, mottled with red, apex often dark purple. The base of the shell is usually much more uniformly coloured, bearing only thin bands of red spots. Inside iridescent.

Locations: La Perouse, Kurnell, Callala Bay.

Habitat and distribution: This species is not common. The animal can be found under stones intertidally and subtidally on rocky sheltered ocean shores. It occurs in Victoria, New South Wales and southern Queensland.

Reference: Macpherson and Gabriel (1962), p. 61.

Subfamily Umboniinae

Tribe Monileini

Ethminolia probabilis Iredale, 1924.
(Plate 2, fig. 1)

Shell small, largest diameter 8 mm, width greater than height. Mouth small, circular, occupying half of the total shell height. Spire flat; spire whorls strongly shouldered; sutures indented. Sides of spire straight. Sculpture consisting of fine growth lines. Outer lip sharp; columella curved. Umbilicus wide and deep.

Colour a dirty white mottled with pink.

Locations: Foreshore Road, Dolls Point.

Habitat and distribution: This species seems to live in sandy estuarine habitats. No live animals were observed. It occurs in New South Wales.

Reference: Iredale (1929).

Talopena gloriola Iredale, 1929. (Plate 2, fig. 3)

Shell small to medium-sized, largest diameter 10 mm, width greater than height. Mouth circular, occupying two-fifths of the total shell height. Spire of medium height; spire whorls rounded and slightly shouldered; sutures impressed. Sides of spire straight. Sculpture consisting of many weak spiral ribs. Outer lip sharp; columella smooth; umbilicus narrow but deep.

Colour a dirty brown, with irregular markings of darker brown; area around umbilicus white.

Locations: Bradley's Head, Foreshore Road, Dolls Point, Yarra Bay.

Habitat and distribution: In estuarine habitats, both sandy and rocky. Live animals were not observed. The species occurs in New South Wales.

Reference: Iredale (1929).

Monilea callifera (Lamarck, 1822).

Shell heavy and solid, medium to large-sized, greatest diameter 25 mm, width greater than height. Mouth circular, occupying up to one half of the total shell height. Spire of low to medium height, spire whorls flatly rounded, sutures impressed. Sides of spire straight. Sculpture consisting of numerous double spiral ribs, crossed by fine growth lines. Outer lip sharp, crenulated, columella bearing a single tooth formed by a spiral groove around the umbilicus. Umbilicus wide and deep, sometimes partially obscured by callus.

Colour a dirty white, mottled with pink or purple. Inside iridescent.

Locations: Airport, Foreshore Road, Yarra Bay, Kurnell.

Habitat: This shell was only found on the beaches around Botany Bay, where dredging was in progress. It appears that *M. callifera* no longer lives in the Sydney area (D. Beechey, pers. comm.). It is a common species throughout the Indo-Pacific and in Australia it occurs from southern Western Australia to New South Wales.

Reference: Wilson and Gillett (1985), p. 39.

Tribe *Bankiviini*

Bankivia fasciata (Menke, 1830).

Shell thin and high spired, largest diameter up to 25 mm; height much greater than width. Mouth elongate, somewhat teardrop-shaped, occupying about one fourth of the height of the shell. Spire whorls flat, sutures barely impressed. Shell smooth and polished. Outer lip thin, often damaged in beach shells. A thin callus covers the columella, which is smooth except for a small, insignificant tooth near the base of the shell.

Colour variable. May be pink, purple, white or light brown, with darker or lighter coloured spiral or zig-zag bands.

Locations: Newcastle Town Beach, Manly's Shelly Beach, Airport, Dolls Point, Cronulla.

Habitat: Sandy beaches on both exposed and sheltered shores. The animals live in large aggregations in fine sand down to 15 m. Live

animals were not observed. This species occurs from South Australia to New South Wales, including Tasmania.

Reference: Wilson and Gillett (1985), p. 40.

Leiopyrga lineolaris (Gould, 1861).

(Plate 1, fig. 3)

This is similar to the previous species, from which it can be separated by its broader appearance, rounder whorls and smaller size. Shell height greater than width, largest diameter up to 15 mm. Mouth less elongate and rounder than in the previous species, occupying one third or less of the total shell height. Spire whorls rounded, sutures impressed. Shell smooth, but less polished than in *B. fasciata*. Some shells have a single spiral rib just above the sutures. Outer lip thin and often damaged in beach specimens, columella smooth and covered with a thin callus, which often just reveals a narrow umbilicus.

Colour mostly white with patterns of pink and brown lines, which often have a smudged appearance. Some specimens have a uniform dark purple colour.

Locations: Narrabeen, Airport, Dolls Point, Cronulla's Shelly Beach, Bulli.

Habitat and distribution: Mostly sandy ocean and estuarine beaches. The species does not appear to be common, live animals were not observed. The species occurs in eastern Victoria and New South Wales.

Reference: Macpherson and Gabriel (1962), p. 67.

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